

## THE IMPACT OF ATHLETIC MOVEMENT ON PROGRAMMING IN TRAINING OF KARATE PRACTITIONERS IN THE FIRST PHASE OF THE PREPARATION PERIOD

*Original scientific paper*

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### Abstract

*The subject of this paper is the influence of programmed athletic movements on improving the speed of karate practitioners. This paper aims to determine the importance of the training program in the period of the mesocycles in children karate practitioners and the results would be used for the further work of the training cycle. The study includes two groups, A and B, one of which A is an experimental group and B is the control one. Group A consisted of 25 male subjects, from 11 – 12 years of age. Subjects are member of Karate sports school in Kraljevo. The control group B had 10 subjects. An initial measurement at the beginning of the training process and final measurement after the experiment was performed. Basic and specific motor abilities were evaluated. Data were analyzed using statistics procedures that are in accordance with defined purpose of the study. In every training process, attention was focused to speed and disciplines in motion. The training process of children and youth should be a specific phase of the long-term process of adaptation of the organism to specific efforts. Two hypotheses were also set up for groups.*

**Keywords:** *athletics movement, school-age karate practitioners, karate training cycles*

### INTRODUCTION

Modern sport, as well as every other creative area, requires constant information gathering, monitoring and control of the state, which is necessary because of the specific orientation and goals required by modern sports (Vuković, Obradović, Đurić, & Mudrić, 2013). In a situation where greater demands in increasing physical fitness are set in sport, the athlete develops and maintains functional and motor skills using appropriate training plans and programs. Fitness and conditioning training is a complex and comprehensive process of implementing various programs for the development and maintenance of functional and motor abilities and morphological characteristics of athletes. The basic task of all programs is to improve training and sporting results by developing general, basic and specific skills and qualities that are a prerequisite for successful performance of training and competitive activities (Banović, 2004). The conditioning programs were created as a result of many years of practical experience of trainers and associates in a large number of different sports, as well as applied researches on modeling and evaluation of various methods of conditioning preparation (Malacko, 2002).

Due to the small number of scientific papers in the field of sports karate for children, conditioned by the small number of professional trainers for school-age, the paper contributes to this area and explains the influence of program parameters on quantitative and qualitative changes in the basic and specific motor skills of children karate practitioners, taking into account the changes occurring in the normal growth and development of children of elementary school-age. Similar investigation on children practicing karate from the aspect of impact on motor abilities, morphological characteristics and motor performance were also done in the studies of Violan, Small, Zetaruk & Micheli (1997); Vuković et al (2013); Vando et al, (2013). Population of children practicing karate was also investigated from the aspect of occurring injuries (Zetaruk, Violan, Zurakowski & Micheli, 2000), changes in functional abilities (Imamura, Yoshimura, Uchida, Nishimura & Nakazawa, 1998; Mikić, 2000; Ravier, Dugué, Grappe & Rouillon, 2009).

In addition to the conducted research, the paper will be complemented by the synthesis of theoretical postulates which have been presented in the science so far and will include all previous studies

and measurements of the children of similar age. In order to present the paper expediently, specific segments will be devoted to the history of karate, subsequent modifications to this martial art sport, with the essential aspects of karate methodology, theory of programmed training and its phases, with particular reference to athletic motions and speed as one of the basic factors for achieving more valuable sporting results.

Kinesiology is a science about the movement of the human body, the laws of motion, the management of exercise and training processes and their effects on the psychosomatic status of man (Platonov, 1997). The word is of Greek origin (kinesis - movement, motion and logos - word, proof, theorem, statement) which denotes the science of movement. It is the science of legalities regulating the maximum efficiency of human movements and transformational processes under the influence of motor activity. It especially studies those systemic movements (exercises, training) that aim at optimal development of the organism, improvement and maintenance of healthy, functional and working abilities, and in particular achievement and maintenance of traits, skills and motor knowledge characteristic for competitive sports activities and achievement of top-level sports achievements. With the help of kinesiology, we can provide certain hypotheses that will prove to be accurate or inaccurate during the conducted research.

We need to keep in mind that we are working with children. Because of that we need to apply correct training methods, level and intensity, according to their years of age and current physical condition (Fratrić, 2006)

### METHODS

To achieve top results in sports karate today, a high quality and manageable training process is very important. The subject of this paper is testing the values of a conducted, programmed karate treatment and its influence on certain motor skills of boys of the standard karate sports school in Kraljevo. The conducted research, in addition to presenting the measurement data itself, will try to point out the changing abilities of children of elementary school age who are involved in the training karate program and to explain their agility when developing athletic movement, noting the changes that occur in the context of the speed of their movements. The skills developed

under the influence of this program in the direction that was predetermined by the hierarchy of the unique specification of motor skills for karate confirmed the value of the program implemented.

This research aims to determine the importance of the training program in the period of the mesocycle in children karate practitioners, so that the results can be used for further advancement of the training cycle in children, as well as for further development of motor skills of young athletes. Initially it determined whether and/or to what extent the applied program will indicate changes in the motor skills of boys and girls under the influence of the karate training. Further more, whether there were differences in the change and development of different motor skills under the influence of training during the preparation period of karate mesocycle between experimental group A and control group B.

The tasks of this research included processing of previous research, analyses of relevant literature, formation of respondents groups, planning of the training cycle, management of the group through the mesocycle program, as well as the standardization of variables, conducting measurements and the analysis of the obtained results.

Following two hypotheses were projected:

H1 – The development of athletic movement in children aged 11 to 12, who are karate school attendants, has an impact on the karate practitioners' movement speed in the mesocycle training period.

H2 – There are statistically significant differences in athletic abilities among sampled children of the same age, 11-12 years of age who attend the karate school and those who do not attend it.

#### **Study design**

The study sample of this study was comprised from totally 35 participants, divided in two groups' experimental group (group A) and control group (group B). Experimental group A was consisted from 25 boys at the age 11 – 12 years. They were all members in sports karate clubs from Kraljevo at minimum one consecutive year. The group, which is determined by a special age, points to a sensitive period in the maturation of children, especially from the kinesiological point of view. In addition to attending training at the sports club, this group also attended classes at the school where they had two hours of 45 minutes of physical education per week. This age represents the highest percentage of children involved in karate sports, which is, accordingly, the most interesting for monitoring and analyzing their motor area. The control group B was comprised from 10 children that were attending only PE classes on regular basis and not attending karate club training.

Experimental group A had identical programmed training of karate for 2 x 60 minutes during one week, 39 weeks during a ten-month training process. In the formation of karate training, the correct proportions of the extensiveness and intensity of training resources aimed at developing the motor skills responsible for the success in karate sports were taken into consideration. Within 6 consecutive weeks, initial, control and final measurement of the respondents was made to the children in both experimental group A and independent control group B.

#### **Sample of variables.**

The sample of variables for motor skills included following motor tests: running at 20m, 30m, 50m, 100m, 200m and 400m; sit-ups, pushups, squats, joints; hand tapping, foot tapping, foot-tapping against the wall; standing long jump and standing high jump.

For morphological characteristics: body weight, body height.

The method of repetition – the athlete repeatedly, as fast as he/she can react to different signals. This method relatively quickly leads to improvement, after which there is stabilization and no further shifts

occur. Stagnation in further development can be postponed by varying the type and intensity of the stimulus, with a concentration focusing on the maximum rapid reaction of the motion, rather than the signal itself.

Method of decomposing – with this method, the goal is to provide an easier way to respond to the set signal by an analytical approach. Thus, for example, the sprinter uses a standing start with a load on hands less than the one at a crouching start. Ravier et al. (2009) emphasize that an increase in load lengthens the reaction time, while better-developed endurance and strength positively affects the shortening of reaction time.

The sensory method – is based on the relationship between the speed of the reaction and the athlete's ability to distinguish small time intervals. The athlete is first exposed to certain signals that he should react to as quickly as possible, but so that after each reaction, he receives feedback from the trainer about the time (e.g. start and sprint of 5 meters). After that, the athlete himself has the task to assess the time-scores achieved and compare them with the achieved. At the end, the athlete is trying to achieve the time-scores set.

The running length ranges from 10 to 60 m depending on the duration or length of the acceleration stage of an athlete. In the annual cycle, a gradual increase in the running length is required by the athlete's abilities. The duration of the acceleration phase depends on the quality of the sprinter. Thus, better sprinters achieve higher top speed at longer runways so their distances are greater than of the less quality sprinter. Breaks between repetitions should ensure complete recovery, and duration depends on the length of the runway.

For the development of acceleration, different types of jumps can be used (short leaps on one or two legs, triple jumps, penta jumps, longer series of jumps on runways of 30 m, 60 m, 100 m and more, up to deep jumps). According to Imamura et al (1998), the value of this type of training is to increase the jumping-off (reactive) power that plays an important role in the ability to accelerate. The application of deep jumps requires the athlete's special readiness to avoid injuries that can occur due to the action of the great force and the eccentric work of the musculature.

Different ways of resisting were used. For example, running up the hill, applying various loads that the runner pulls. When running up the hill, it is necessary to apply the slope of the terrain where the runway technique is not significantly disturbed, with runways not exceeding 40 – 50 (Padulo et al., 2014). The use of the parachute as a means of providing resistance has many advantages over other types of resistance, among other things due to the force of resistance acting at the center of gravity of the body at a favorable angle in relation to the pulling of different loads that glide over the ground, which less disturbs the running technique.

#### **Description of variables and training procedure**

Elemental training of maximum speed of movement. Since temporal programs after puberty show considerable rigidity and that it is very difficult or almost impossible to change them, it is necessary to start with elemental speed training at the right time. For this purpose, it is possible to use running exercises of general character. The basic logic of this type of training is to create the conditions for reaching the desired temporal programs by changing the conditions under which a particular exercise is performed.

Complex training of maximum speed of movement.

- Progressive running - running with a gradual increase in speed at runway sections of 60 to 100 m, with the last 30 to 40 m to be performed at the maximum speed.

- The flying sprint - the athlete gets the task to run 20 to 30 meters with maximum speed after 30 m of relaxed running.

- Running downhill - is applied to increase the frequency and length of the step, as the athlete achieves speeds higher than those on a flat ground due to the facilitated conditions. The track length should be up to 80 m, and the slope about 3 degrees.

- Running with a change of pace - for example, 30 m at the maximum pace, 50 m at the moderate pace (the total runway of 200 - 300 m).

- Coordination running - involves the use of exercises from an athletic running school: crouched and standing start, grabbing step, pushing back lower legs, jumping from one foot to the other, etc.

- Switching from coordination running to sprint - after an exercise from a running school (e.g. a crouching start) gradually crossing to the maximum sprint.

- Short sprints from crouching start (up to 60 m) - are a training tool for combined development of reaction speed, acceleration and maximum speed. When applying these loads with the goal of complex action on the development of speed as a fitness capability, it is recommended that training is planned with contrasting methods that involve the constant variation of both content and goals, as well as the intensity of exercise within a single series or training unit.

**Data analyses**

The obtained results of the measurements of manifest specific-motor tests were processed by appropriate statistical methods, which were in function of the defined goal and determined research tasks. To determine the changes, t- test was applied between the initial and final state measurements of all motor variables. Group A was subjected to initial and final testing. For Group B, which was the control group, measurements were also made in same manner.

**RESULTS AND DISCUSSION**

Discrimination of analyses was conducted between groups of respondents in the initial or final state for independent and dependent samples to analyze the differences between groups of respondents. The differences of the initial state and the final state for the experimental group of respondents in the manifest and latent space gave a final estimate of the values of the effect of movement on the speed of movement in the programmed training for children attending karate classes. Table 1 represents the results obtained in the final measurement of control group. Results for experimental group in initial and final measurement are presented in Table 2 and 3. The initial and final results of the control group were very similar, and because of that, we haven't displayed them.

If we compare the control and experimental group, we can see that the population in experimental group had better results in all tests, but that significance is very small or nonexisting, so we can say that on the initial results experimental group didn't have significantly better results than control group.

As presented in Tables 2 and 3, the results of the initial and final measurement in all segments of running show a significant improvement in achieving the speed of children karate practitioners, except in running at 50m where a deviation occurred. The average running speed at 50m at the initial measurement is  $M = 9.5$  s, while in final measurement it is  $M = 9.6840$  s. Here, at the final measurement, the result was lower than on the initial measurement of  $Sig. = 9.5 < 9.68$ .

Improvements are also visible in measurements of tapping, sit-ups, push-ups, pull-ups and squats, where improvements in all measured exercises are shown without deviation. Although hand tapping, foot tapping and foot-tapping against the wall were expected to offer better results, some other similar target group studies have shown that, although they exceed the results from the initial measurement, improvements are small. Thus, for example, hand tapping with

*Table 1: Basic descriptive statistic parameters from final measurement for control group*

Item	N	Minimum	Maximum	Mean	Std. deviation
Running at 20m	10	4.70	6.50	5.60	1.27
Running at 30m	10	6.40	7.30	6.85	0.64
Running at 50m	10	8.10	11.50	9.80	2.40
Running at 100m	10	17.80	22.60	20.20	3.39
Running at 200m	10	39.20	49.90	44.55	7.57
Running at 400m	10	93.30	110.10	101.70	11.88
Sit-ups (1 min)	10	18.00	45.00	31.50	19.09
Pushups (1 min)	10	11.00	40.00	25.50	20.51
Squats (1 min)	10	37.00	68.00	52.50	21.92
Pull-ups (2 min)	10	0.00	7.00	3.50	4.95
Hand tapping (15s)	10	34.00	53.00	43.50	13.44
Foot tapping (15s)	10	38.00	57.00	47.50	13.44
Foot tapping against the wall (15s)	10	18.60	31.20	24.90	8.91
Standing long jump (cm)	10	108.00	180.30	144.15	51.12
Standing high jump (cm)	10	52.10	63.40	57.75	7.99

*Table 2: Basic descriptive statistic parameters from initial measurement for experimental group*

Item	N	Minimum	Maximum	Mean	Std. deviation
Running at 20m	25	4.50	6.10	5.3	1.13
Running at 30m	25	6.20	6.90	6.55	0.49
Running at 50m	25	7.90	11.10	9.5	2.26
Running at 100m	25	17.60	22.20	19.9	3.25
Running at 200m	25	39.00	49.50	44.25	7.42
Running at 400m	25	93.10	109.70	101.4	11.73
Sit-ups (1 min)	25	19.00	46.00	32.5	19.09
Pushups (1 min)	25	12.00	41.00	26.5	20.20
Squats (1 min)	25	38.00	69.00	53.5	21.92
Pull-ups (2 min)	25	0.00	8.00	4.0	5.65
Hand tapping (15s)	25	35.00	54.00	44.5	13.43
Foot tapping (15s)	25	39.00	58.00	48.5	13.43
Foot tapping against the wall (15s)	25	19.00	32.00	25.5	9.19
Standing long jump (cm)	25	109.00	181.30	145.15	51.12
Standing high jump (cm)	25	53.10	64.40	58.75	7.99

*Table 3: Basic descriptive statistic parameters from final measurement for experimental group*

Item	N	Minimum	Maximum	Mean	Std. deviation
Running at 20m	25	4.10	5.20	4.50	.36
Running at 30m	25	5.80	6.70	6.22	.27
Running at 50m	25	7.90	11.00	9.68	.63
Running at 100m	25	15.60	21.00	18.40	1.58
Running at 200m	25	36.00	47.80	40.39	3.04
Running at 400m	25	78.50	107.00	95.08	6.27
Sit-ups (1 min)	25	25.00	59.00	38.04	9.14
Pushups (1 min)	25	12.00	50.00	27.44	9.06
Squats (1 min)	25	40.00	70.00	54.68	7.39
Pull-ups (2 min)	25	1.00	13.00	5.36	3.31
Hand tapping (15s)	25	35.00	55.70	45.56	5.96
Foot tapping (15s)	25	40.00	62.00	49.20	5.32
Foot tapping against the wall (15s)	25	23.00	31.00	27.00	5.66
Standing long jump (cm)	25	121.00	182.30	152.94	14.00
Standing high jump (cm)	25	57.50	66.80	62.34	2.96

M = 44.5 at the initial measurement increased at the final M = 45.568, where Sig. = 44.5 < 45.568 indicates small statistical changes.

In standing long jumps and high jumps, there are significant improvements in the results from the initial measurement to the final results. The measurements of standing long jump recorded at the initial measurement were M = 145.15, and in final this result is statistically very convincing M = 152.948 where Sig. = 145.15 < 152.948.

## CONCLUSIONS

In the organism of children in the period of 11-12 years or earlier, the harmonious development of all organic systems is taking place, and the various movements and exercises of the general-development type positively affect the motor development of children (Doder, 2000). Differentiation of motor abilities is conditioned by the rate of central nervous system (CNS) maturation, individual differences in the number and type of learned movements, so it is very difficult to monitor the common motoric behavior in the pre-puberty period and in the puberty itself. Therefore, the statistically obtained measurement results, as much as they tell us about improving the results, can say very little under what conditions they have improved. For example, a girl attending the school who belonged to an experimental group, achieved the highest results in the exercises implying flexibility, but her previous doing gymnastics certainly affected the results in karate. Statistically, although the children were subjected to the examination of their 4 morphological characteristics, many of the things that are not common to all are omitted.

The program of the karate club's work is not extensive because a large number of children go through our club during the year, but a relatively small number remains for many years. The so-called dropout of attendants can be prevented by an adequate individual approach, more individual talking and explanations so that children understand the problems they encounter during training and in the combat.

Based on obtained results, related to the first hypothesis, observing the raw data we concluded that there are differences between the initial and final state of the experimental group concerning all variables, except in running at 50 m where there was a deviation. In general, looking at the improvement of the results or, more precisely, the differences between the initial and the final measurement are not great, but for one phase of the microcycle in which the children are prepared to achieve the best possible results it can be said that it has fulfilled its goal of improving the children karate practitioners.

From the point of H2, regarded the statistical significant differ-

ences in motor abilities among karate participants and children that don't practiced it, from the 15 tests related to athletic abilities only one test, particularly pushups, a difference was observed between children attending the karate school and the control group (children who do not attend a karate school). There are no statistically significant differences in athletic abilities among sampled children of the same age who attend the karate school and those who do not attend it.

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